

"even more than casually alluded to in works on geographical distribution," and is "ignored in the principal ones," when I have devoted no less than six pages of my book on "The Geographical Distribution of Animals" (vol. ii. pp. 42-48) to a discussion of the main facts—quite as much as could be properly given to it in a general work. It is, however, well worthy of a detailed study, which I am very glad is being undertaken by so competent an entomologist. I hope Mr. McLachlan will endeavour to obtain collections of coleoptera and other orders of insects from the higher tropical Andes, where, I feel confident, some northern forms will also be found.

ALFRED R. WALLACE

Mr. Crookes and Eva Fay

A FEW words from myself seem to be called for by the recent letter of Mr. Crookes in reply to Prof. Carpenter, published in your journal. As far as I am concerned, the breach of etiquette complained of can only apply to my obtaining the publication of the letter Mr. Crookes addressed to me in the *Banner of Light*. The subsequent *facsimile* that appeared I am not in any way responsible for.

The part I took in the matter is very simple, and may be briefly explained as follows:—On Mrs. Fay's return from England to this country the genuineness of her mediumship was very much doubted, and was the subject of controversy not only in the spiritual journals, but in other papers as well. Having, whilst in England, satisfied myself that the manifestations were real, I defended her to the best of my ability, and on seeing it stated in the *Boston Herald* that Mr. Crookes had withdrawn his confidence in her, I thought it prudent to write to that gentleman, mentioning my reason for so doing. In due time I received a courteous reply, which I at once took to the *Banner* office, never dreaming that Mr. Crookes could have any possible objection to its publication after the articles he had himself published on the subject in the English journals. Months elapsed, when one day to my surprise I met with the *facsimile* letter in the *New York Daily Graphic*. On mentioning the subject to the editor of the *Banner* he also expressed surprise, and stated his inability to account for the publication of the *facsimile*. He at first was of opinion that I had taken the letter away and mislaid it; but on searching, the document was subsequently found in the office. Hereupon both Mr. Colby and myself wrote to the editor of the *Graphic*, requesting him to state how he obtained possession of the original letter, so as to get the *facsimile* prepared; but neither of us received a reply. I then got a gentleman residing in New York to call on the *Graphic* editor on the subject, and was informed that the said editor declined to say how he obtained possession of the letter. Thus the matter stands, and is as inexplicable to-day as it was at the time it happened.

I entirely exonerate the editor of the *Banner* and his associates from any complicity in the matter, and I trust Mr. Crookes, after this explanation, will see that his imputation against American honour is wholly unfounded.

The publication of the letter in the *Banner* I alone am answerable for; and as I explained in my letter to Mr. Crookes that my object was to meet a statement in a public journal, I of course thought that he must have felt that the reply he forwarded would in all probability be made public use of.

Boston, U.S.A., December 7, 1877

ROBERT COOPER

P.S.—Mr. Crookes errs in speaking of me as "a Boston gentleman." I am an Englishman temporarily located here.—R. C.

Philadelphia Diploma

IN NATURE, vol. [xvii. p. 153, it is stated that "A 'Dr.' Harmuth, in Berlin, who received his diploma from Philadelphia, was lately sentenced to pay 300 marks for using the prefix publicly." It is but just to so old and respectable a university as that of Philadelphia to point out that "Dr." Harmuth's diploma could not have been genuine. So-called "Philadelphia degrees" of all sorts are sold by agents, but they have no connection with the University of Philadelphia, nor have they, at present, any connection with the city, though the author of this scandalous imposition once lived there and carried on a disreputable practice as a quack doctor. The public should still be on their guard against Bogus degrees, for diplomas purporting to issue from several American and German universities are still to be had, in

some cases on examination *in absentia* and payment of the fee, in others by a money payment only.

C. M. INGLEBY

Valentines, December 26, 1877

Royal Dublin Society

IN justice to myself I beg to state that my function as editor of the Natural Science papers in the "Scientific Proceedings of the Royal Dublin Society" begins only with Part 2 of that journal, and that I had no knowledge whatever of the material contained in Part 1 until it had been printed and circulated. By publishing this I shall be greatly obliged.

ALEX. MACALISTER

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The Meteor of November 23

I HAVE just seen Capt. Tupman's letter in NATURE (vol. xvii. p. 114). I can give a fairly accurate estimate of the direction of the meteor from Llandudno at the time it burst. Sitting in a lighted room my eye was attracted by a bright bar of light across the hearth-rug similar in shape to a gap in the Venetian blind caused by a broken tape. The light slowly faded out in about the same place, which was easily remembered. I listened intently for a report for perhaps about a minute, gave it up, and then heard what was somewhat like the report of a ship's gun at a short distance.

It was easy afterwards to estimate the direction of the light as two points west of (true) north, and thirty-five degrees above the horizon.

I regret that the time between the fading of the light and the report I can only guess very roughly. It may have been about two minutes.

T. S. PETTY

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THE SUN'S MAGNETIC ACTION AT THE PRESENT TIME

PERHAPS no result in magnetism has excited so much interest as that which has connected the varying diurnal oscillation of the magnetic needle, and the frequency of the aurora polaris, with the spotted area of the sun's surface, in a common cycle of ten and a half years. Various investigations have been undertaken in order to determine whether other phenomena could not be found which would take a place in this chain.

That the movements of the magnets and the corruscations of the aurora are due to the cause which produces the immense chasms in the sun's envelopes there can be little doubt; but we know nothing of the mode in which the sun acts on our earth to produce these effects, and we have reason to believe that this ignorance has prevented us hitherto from tracing to the same cause atmospheric variations which have been attributed altogether to the solar heating action.

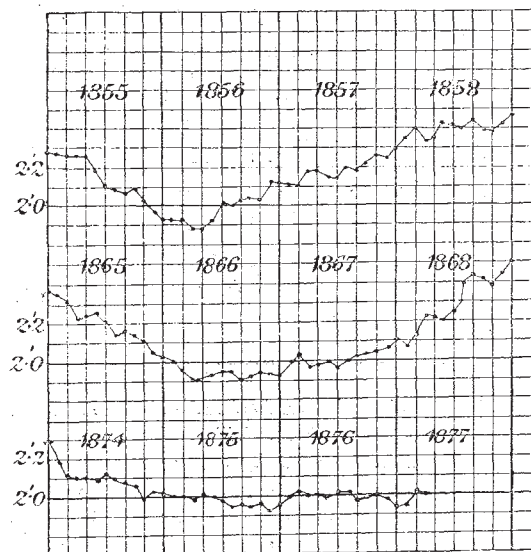
Any facts, then, as to what the sun is doing at the present time with the earth's magnetism will not be without value, whether we regard the facts alone, or as connected with their hypothetical relations to atmospheric phenomena. It should always be remembered, however, that the variations of magnetic oscillations in the decennial period, shown at any one station on the earth's surface, agree generally with those shown over the whole globe, while the meteorological phenomena are so much affected by conditions of position that it is difficult to distinguish what is due to local and what to cosmic causes.

It is well known to those who have studied this subject, that the interval from the time when the sun has fewest, till that when he has most, spots has been less than that from the maximum to the minimum; and that the same fact has been observed in the case of the magnetic oscillations. The way in which the changes of the latter occur near the times of successive minima has not, how-

ever, been studied. The accompanying diagram will show this for the last three minima.

If we suppose that the mean diurnal movement of the magnetic needle is determined for each month, we obtain the amount of the oscillation or range; the mean of the ranges thus found for twelve successive months is represented by a point in the curves; thus the last point in the lowest curve represents the mean of the ranges for the twelve months, October, 1876, to September, 1877 (corresponding to April 1, 1877), as shown by the observations made in the Trevandrum Observatory (nearly on the magnetic equator). The point immediately preceding represents the mean range for the twelve months, September, 1876, to August, 1877, and so on for the other points.

If these curves are examined, it will be seen, that in the upper one the minimum is very clearly marked by two points corresponding to April 1 and May 1, 1856 (repre-



sented the mean ranges, October, 1855, to September, 1856, and November, 1855, to October, 1856), and that there is little difference in the rapidity with which the curve descends to, and ascends from, the minimum.

In the middle curve the epoch of minimum is by no means so distinctly marked; it occurs between the points for April 1 and September 1, 1866. There is also a considerable difference in the rapidity of variation in the descending and ascending branches of the curve. The descent is nearly as rapid as in the upper curve, but the ascent is very much slower.

In the lower curve, the lowest point is that for December 1, 1875, but it is even now, with points for a year and a half later, difficult to say whether this is the minimum or not, the point for January 1, 1877, being only 0'02 (two-hundredths of a minute of arc) higher. In this curve the change of range in the diurnal oscillation is quite insignificant from November 1, 1874, to April 1, 1877, including the ranges from May 1, 1874, to September 30, 1877, an interval of three years and five months. If this result is confirmed by other observations, as I believe will be the case, no such constant state of the sun's magnetic action will have been observed since the last years of the eighteenth century.

The observations of sun-spots, even if they give as accurate a measure of the intensity of the cause as that obtained from the movements of our magnets, cannot be observed with the same continuity, nor be measured with the same precision; but I have little doubt they will confirm generally the result shown in the last curve, as they have in preceding cases.

With regard to the aurora borealis, the appearances seem to have been very rare during the last two winters. In the report by Capt. Sir G. Nares, on the Arctic expedition, he says that in the winter of 1875-76, "Light flashes of aurora were occasionally seen on various bearings, but most frequently passing through the zenith; none were of sufficient brilliancy to call for notice. The phenomena may be said to have been insignificant in the extreme, and, as far as we could discover, were totally unconnected with any magnetic or electric disturbance" (NATURE, vol. xv. p. 35).

In the twelve months including September, 1843, and August, 1844, including the epoch of minimum disturbance and of auroral frequency, I observed in the south of Scotland (in lat. $55^{\circ} 35'$) thirty appearances of the aurora, and from September, 1844, till the end of 1845, fifty-nine appearances were observed at this single station.¹ Making every allowance for the continuous watch over the magnetic instruments at the Makerstoun Observatory during these years, the difference between Capt. Sir G. Nares' result, in so high latitude, in 1875-76, and that for the south of Scotland, is very distinct. I ought to add, with reference to the apparent want of connection of the faint auroral appearances with the magnetic disturbance noticed by Sir G. Nares, that several of the auroræ observed by me were of the very faintest kind, mere "traces," as I have termed them, which I could never have remarked had I not been warned by *very slight* magnetic irregularities to examine the sky with the greatest attention. Again, in no case have I seen the faintest trace of an aurora without finding at the same time a corresponding irregularity in the movement of the force or declination magnet.

I am unacquainted with any observations of the aurora made in the British Isles during the last two winters;² I believe that no scientific institution exists in this country which makes the look-out for aurora throughout the night a definite portion of its work, and that all our knowledge of this phenomenon appears to be left to the chances of some one being out, at the hour of a display, sufficiently bright to attract his attention who will take the trouble to communicate his observation to a public journal.

JOHN ALLAN BROWN

P.S.—I have to thank Mr. A. Buchan for kindly furnishing me with a note of the auroras seen at the stations of the Scottish Meteorological Society during the year 1876. These amounted to forty-two in number, twenty-six in the first half and sixteen in the second half of the year. The greater part were seen in the most northerly stations, including the Orkney, Shetland, and Farø Islands; nine only having been seen south of the Forth. I cannot, however, compare the total result from the hundred stations of the Society with that from the single southerly station of Makerstoun in 1844, since much depends on the nature of the watch kept in each case. It is, however, gratifying to find that so much attention is given at the stations of that highly useful scientific body, the Scottish Meteorological Society, to the observation of this phenomenon.

December 31, 1877

¹ "General Results of the Makerstoun Observations," p. lxxv., *Trans. Roy. Soc. Edin.*, Part 2, vol. xix.

² I do not omit Mr. Kinahan's account of "auroral lights," which he saw so frequently in the winter of 1876-77, and which he considered a species of aurora borealis (NATURE, vol. xv. p. 334), as I think there must have been some mistake as to the nature of those lights. He says they were "very common and brilliant during 'the dark days' of December, a few hours before dawn (about five o'clock)." The aurora borealis is very rarely seen at five A.M. in this country. In the two years, 1844 and 1845, during which the aurora was sought for at Makerstoun every hour of the night, it was observed on seventy-seven nights on an average of nearly three hours each night, but it was seen only twice so early, and that with a bright or brilliant aurora which remained during five hours on the first occasion, and from six P.M. to six A.M. on the second. I cannot say, also, that I have ever seen parts of the phenomenon described by Mr. Kinahan, and I had hoped that some other observer in Ireland would have confirmed his observations, which, if exact, would be most important, especially as made so frequently at the epoch of minimum.